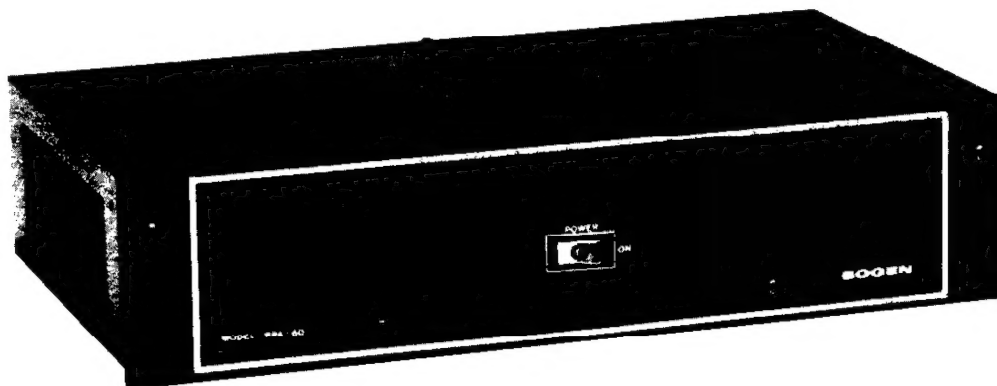


# BOGEN<sup>®</sup>

COMMUNICATIONS, INC.

## BASIC POWER AMPLIFIER

**BPA-60**



### TECHNICAL SPECIFICATIONS

**Rated Output Power:** 60 watts rms (see curves)  
**Total Harmonic Distortion:** Less than 2% from 50Hz to 15kHz  
**Frequency Response:** -2dB, 20Hz to 20kHz  
**Input Sensitivity:** High-impedance, 300mV; low-impedance balanced, with optional transformer, 75mV

**Hum and Noise:** 85dB below rated output

**Output Loads:** 8-ohms/25V, 16-ohms, 25VCT, 70V

**Output Regulation:** Better than 2dB from no load to full load

**Input Impedances:** High-impedance, 50k-ohms unbalanced; low-impedance, 600 ohms, balanced or unbalanced; 1:1 bridging with accessory transformers

**Lo-Cut Filter:** -10dB at 100Hz (switch-selectable)

#### Controls and Indicators:

Front Panel—Illuminated on/off power switch

Rear Panel—Input level control, circuit breaker reset, lo-cut switch

**Power Consumption 120VAC, 60Hz:** 180W at full rated output  
**Overload Protection:** Transient protection diodes, electrical circuit breaker, 105°C thermostat

**Operating Temperature Range:** -20° to +55°C at rated output  
**Auxiliary Receptacle (not switched):** Three-wire grounded\* 300W maximum

**Dimensions:** 15-1/4"W x 8"D x 3-1/2"H (38.7 x 20.3 x 8.9cm)

**Finish:** Black

**Weight:** 19 lbs. (8.6 kg)

**Accessories:** Model TL600, 600-ohm line-matching transformer;

Model TL100, 1:1 ratio transformer

**Rack Panel Brackets:** Bogen Model RPK-53

\*This receptacle will be grounded only if the amplifier is properly grounded.

All specifications are subject to change without notice.

**Before Operating This Unit, Please Read These Instructions Carefully**

## DESCRIPTION

The Bogen Model BPA-60 amplifier has been designed to fulfill the basic power amplification requirements of professional and commercial sound systems. The BPA-60 supplies 60 watts rms output. Total harmonic distortion is less than 2% at rated output from 50 to 15,000Hz with a frequency response of -2dB from 20 to 20,000Hz, as illustrated in the performance characteristics graphs.

An input signal of only 300mV is required for full rated output (75mV for low-impedance balanced input with accessory transformer TL600). Input impedances are: high-impedance (50 kilohms) unbalanced; low-impedance (600 ohms) balanced, with accessory transformer TL600. Output impedances are: 8 ohms/25V, 16 ohms, 25VCT, and 70V.

An amplifier that provides a 25-volt or 70-volt constant-voltage output may be used to drive the BPA-60 amplifier. Line-bridging may be achieved using accessory transformer TL100.

A lo-cut filter provides -10dB attenuation at 100Hz. An input level control (screwdriver-adjustable) allows higher inputs without overdrive.

An AC circuit breaker and transient protection diodes prevent damage due to overloads. The amplifier is also thermally protected from excessive temperatures; however, it will deliver the full rated power output continuously, even at +55°C (130°F).

An illuminated power switch is located on the front panel. Input and output connectors, input level control, lo-cut filter switch, AC circuit breaker, and auxiliary power receptacle are located on the rear panel. The thermal breaker and accessory transformer socket are located internally.

The amplifier operates from a 120 volt, 60Hz source. The three-wire line cord provides automatic grounding of the amplifier and auxiliary receptacle when connected to a properly grounded three-wire power outlet.

## INSTALLATION

### UNPACKING

The amplifier was carefully checked before leaving the factory. Inspect the shipping container carefully for indications of damage. If the amplifier has been damaged, place an immediate claim with the distributor from whom it was purchased. If the unit was shipped to you, notify the carrier without delay and place a claim.

### RACK MOUNTED INSTALLATION

The amplifier may be mounted in a standard 19 inch equipment rack, by using the Bogen Model RPK-53 Rack Panel Kit, which includes two brackets and the necessary hardware for installation.

#### NOTE

*Before installing the amplifier in a rack, install any accessory transformers required. See INPUT CONNECTIONS.*

**RPK-53.** Attach a bracket to each side of the unit and secure (with screws provided) through the holes on the side panel. Each bracket measures 3-1/2"H x 1-15/16"W x 1"D (8.9 x 4.9 x 2.5 cm).

### VENTILATION

The amplifier generates heat during operation. Although the amount of heat is relatively low, the amplifier must be ventilated to prevent excessive rise in temperature. If other heat-producing equipment, or several amplifiers have been installed in an enclosed rack or cabinet, ensure that the ambient air temperature does not exceed 55°C (130°F). To determine this, operate the system until the

temperature stabilizes, then measure the air temperature near the amplifier, using a bulb-type thermometer. If the temperature exceeds 55°C, space the equipment farther apart or install a fan.

## POWER AND GROUNDING

The three-wire AC line cord has a three-prong plug which should be plugged into a properly grounded, three-wire, 120V, 60Hz outlet. **IT IS IMPORTANT TO GROUND THE AMPLIFIER.** If the outlet is not properly grounded, connect a wire from the GND terminal of the amplifier to a suitable earth ground.

## AUXILIARY POWER

### CAUTION

*The front panel POWER switch does not control the auxiliary receptacle.*

The AUX POWER receptacle on the rear panel is a three-wire grounded outlet and may be used to supply power to accessory equipment in the sound system. Ensure that the accessory equipment does not require more than 300 watts. Equipment connected to the auxiliary receptacle will be grounded, provided the amplifier line cord has been properly grounded.

## INPUT CONNECTIONS

### WARNING

*The following installation instructions are for use by qualified service personnel only. To avoid an electric shock hazard, do not perform any functions requiring the removal of the cover of the amplifier unless you are qualified to do so.*

**LOW-IMPEDANCE BALANCED INPUT.** A balanced input, provided at the BAL LO-Z terminal strip (Figure 1), requires the installation of a Bogen Model TL600 line-matching transformer. Remove the top cover of the unit and install the transformer in the socket designated XT-1 (see Figure 2) on the printed circuit board. If an unbalanced input is required, connect a jumper from the GND terminal to an adjacent input terminal.

**HIGH-IMPEDANCE INPUT.** A high-impedance input is provided by standard RCA jacks (see Figure 1). An input signal of 300mV is required for full rated output.

**BRIDGING INPUT.** The inputs of two or more amplifiers may be paralleled by installing accessory transformer TL100 (for up to 6 amplifiers) in the transformer socket designated XT-1 (see Figure 2) on the printed circuit board. Connect the signal source to the BAL LO-Z terminal strip and connect the cable shield to the GND terminal. For an unbalanced input, connect a jumper wire from the GND terminal to an adjacent input terminal.

**INPUT FROM ANOTHER AMPLIFIER.** The BPA-60 may be driven from an amplifier that provides a 25-volt or 70-volt constant-voltage output. Connect the output of the driver amplifier to one of the HI-Z input jacks via a resistor network (see Figure 3). These resistors are in addition to the normal loudspeaker load impedance on the output of the driver amplifier.

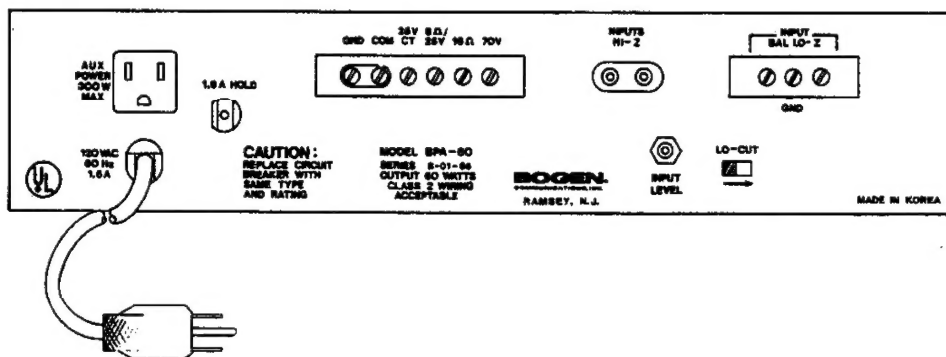


Figure 1 - RPA-60 Rear Panel Connection Diagram

## OUTPUT CONNECTIONS

### CAUTION

*Follow local electrical codes when connecting amplifier output.*

Figure 1 shows the location and impedance values for the output terminal strip. Class 2 wiring is acceptable for output loads.

**SPEAKERS.** The amplifier may be used with most conventional speaker systems.

Connect speaker systems directly to the output terminal strip on the rear panel. Connect one speaker lead to the COM terminal and the other to the terminal corresponding to the impedance of the speaker system. If the load impedance falls between two output terminal values, use the terminal of lower impedance. Total power distribution to the speakers should not be greater than the power rating of the amplifier. For balanced output lines, remove the link between the COM and GND terminals. If the line is shielded, connect the shield to the GND terminal. For unbalanced speaker lines, close the link between the COM and GND terminals.

**HUM.** If the connections between the signal sources and amplifier are incorrect or defective, hum-type interference may occur. Check for proper grounding, broken wires or shields, poor connector con-

tacts, etc. Keep input cables away from speaker cables and speaker cables away from AC power lines. Where a turntable or other auxiliary equipment is used, it may be necessary to connect a separate ground wire from the chassis of such equipment to a suitable earth ground.

## OPERATION

**POWER.** The POWER switch applies power to the amplifier; it does not control any associated equipment which may be connected to the auxiliary power receptacle on the rear panel. The switch lamp will illuminate when power has been applied to the unit.

**LO-CUT FILTER SWITCH.** The LO-CUT filter switch, located on the rear panel, provides  $-10\text{dB}$  attenuation at  $100\text{Hz}$ .

**INPUT LEVEL CONTROL.** The INPUT LEVEL control (screwdriver-adjustable), located on the rear panel, is used to adjust the input signal applied to the amplifier. Turn the control clockwise to increase the level.

### CAUTION

*Many loudspeakers may be damaged if overdriven. Therefore, always begin system setup with the INPUT LEVEL control fully counterclockwise and gradually increase the setting to obtain the desired output level.*

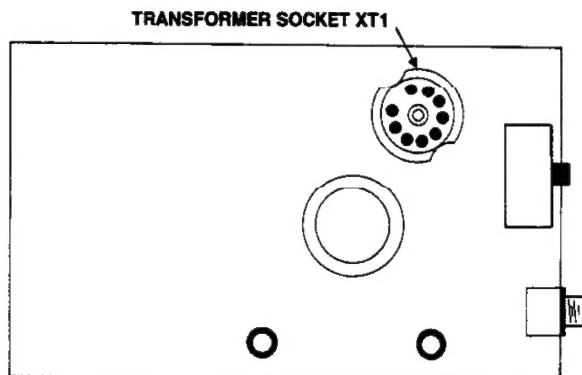


Figure 2 - BPA-60 Printed Circuit Board

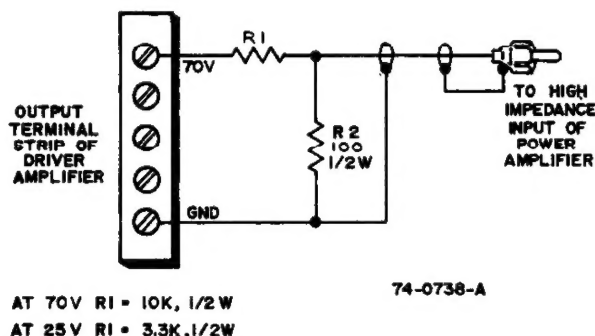


Figure 3 - Input From Another Amplifier

**THERMAL BREAKER.** If the thermal breaker opens, there will be no audio output; however, the power switch lamp will remain illuminated. Wait approximately two minutes for the breaker to reset. If it resets and then opens again, investigate the cause of the temperature overload. This may be due to improper connections at the output terminals or to excessive environmental heat with inadequate ventilation. The thermal breaker will open when the temperature at the output transistor heat sink reaches 105°C.

**CIRCUIT BREAKER.** If the AC circuit breaker opens, the power switch lamp will go out and the amplifier will have no output; however, there will be power at the AUX POWER receptacle on the rear panel. Set the POWER switch to OFF and momentarily depress the red button on the circuit breaker to reset it. Return the POWER switch to ON. If the circuit breaker trips again, do not attempt to reset it; have the trouble investigated by a qualified technician.

## MAINTENANCE

### CAUTION

*There are no user-serviceable parts within the amplifier. Have all internal servicing performed by a qualified technician. The warranty will become void if repairs are made by other than the Bogen Service Department or authorized service agency.*

## BOGEN SERVICE

We are interested in the maintenance of your Bogen equipment. In the event of any difficulty, do not hesitate to ask our advice or assistance. Information may be obtained by writing to: Service Department, Bogen Communications, Inc., P.O. Box 575, Ramsey, NJ 07446.

When communicating with us, give the model and series designation of your unit. Describe the difficulty and include details on the electrical connections to associated equipment, such as preamplifiers, speakers, etc. We will send you service information if the trouble appears simple. If the amplifier requires servicing, we will send you the name and address of the nearest authorized Bogen service agency.

When shipping the amplifier, pack it well, using the original shipping carton or similar container and filler material to prevent damage in transit. *Remove any plug-in transformer from the printed circuit board before shipping.* Send the unit, fully insured and freight prepaid via UPS or other responsible carrier. It will be returned to you collect (or freight prepaid while in warranty).

## REPLACING COMPONENTS

All semiconductor components on the printed circuit board are soldered in place to ensure maximum reliability. When soldering or unsoldering transistors and diodes, use a heat sink (such as a small alligator clip) between the source of heat and the component. When replacing driver and output transistors, be certain to install the case/heat sink insulator, after lightly coating both sides with a thermal conducting compound (such as Dow Corning No. 340, or equivalent).